

REMARKS

I. STATUS OF THE CLAIMS

Claim 23 is canceled herein.

In view of the above, it is respectfully submitted that claims 1-22 and 25-35 are currently pending. Of these, claims 1-19, 25 and 35 are allowed.

II. REJECTION OF CLAIMS 20, 22, 23 AND 26-29 UNDER 35 USC 103 AS BEING UNPATENTABLE OVER GRUBB (US PATENT NO. 6,344,922)

Claim 20 relates to a method for supplying pump light used for Raman amplification in an optical transmission line, comprising (a) a first step of supplying pump light having a first optical power to said optical transmission line; (b) a second step of detecting optical power of light Raman-amplified by said pump light having said first optical power; (c) a third step of supplying pump light having a second optical power higher than said first optical power, to said optical transmission line; (d) a fourth step of detecting optical power of light Raman-amplified by said pump light having said second optical power; and (e) a fifth step of giving a warning about anomaly when a comparison result between detection results of the second step and the fourth step is within a predetermined range.

The Examiner asserts that such operation is shown in column 6, lines 57-66; column 4, lines 10-17; and column 8, line 67, through column 9, line 10, of Grubb.

Column 6, lines 57-66, and column 4, lines 10-17, of Grubb, indicate that the pump light energy can be dynamically varied to produce a controlled signal intensity variation profile over the signal wavelength range. Moreover, column 8, line 67, through column 9, line 10, of Grubb, indicates that a local controller 34 can transmit/ receive supervisory and or monitoring information.

However, it is respectfully submitted that these portions of Grubb do not disclose or suggest supplying and detecting different pump lights at different optical powers, and giving a warning when a comparison result between detection results is within a predetermined range.

For example, the cited portions of Grubb do not disclose or suggest any type of comparison of lights that have been amplified by Raman pump lights with different optical powers.

Please note that claim 20 recites a specific manner of supplying pump light, detecting Raman amplified light, and the giving of a warning when a specific situation occurs. More specifically, claim 20 recites supplying pump light having a first optical power; detecting optical power of light Raman-amplified by said pump light having said first optical power, supplying pump light having a second optical power higher than said first optical power, to said optical

transmission line; and detecting optical power of light Raman-amplified by said pump light having said second optical power. Grubb does not disclose or suggest this operation.

Further, claim 20 specifically recites giving a warning about anomaly when a comparison result is within a predetermined range. It is respectfully submitted that the general disclosure cited by the Examiner in Grubb, relating to the use of supervisory and monitoring information, does not disclose or suggest such a warning. For example, the cited portions of Grubb do not mention any type of warning.

Moreover, to further distinguish over Grubb, claim 20 is amended to recite the first optical power being lower than a power level of normal operation for Raman amplification, and the second optical power being higher than a power level of normal operation for Raman amplification. See, for example, FIG. 13, and the corresponding disclosure on page 41, line 7, through page 42, line 24, of the present application. Grubb does not disclose or suggest such operation.

* * *

Claim 22 recites a method comprising (a) supplying a first pump light to an optical transmission line, the first pump light causing an optical signal having a first wavelength band traveling through the optical transmission line to be Raman amplified; (b) supplying a second pump light to the optical transmission line, the second pump light causing an optical signal having a second wavelength band traveling through the optical transmission line to be Raman amplified, the second wavelength band not overlapping with the first wavelength band; (c) detecting optical power of the Raman amplified optical signal having the first wavelength band; (d) detecting optical power of the Raman amplified optical signal having the second wavelength band; and (e) maintaining deviation of Raman amplification gain between the first and second wavelength bands within a predetermined deviation range by adjusting a power level of the second pump light so that the detected optical powers both fall within a predetermined fixed range.

As an example of different wavelength bands which do not overlap, one band might be, for example, the C-band and the other band might be, for example, the L-band. See, for example, page 25, lines 13-14, of the specification. Of course, the claims are not limited to these examples of wavelength bands.

Claim 22 is amended to clarify the above-described operation. Support for the amendments is found, for example, on page 28, line 4, through page 29, line 3, of the specification.

Grubb does not disclose or suggest such operation. For example, Grubb does not disclose or suggest any type of control with respect to first and second wavelength bands which do not overlap.

Please note that the amended claim 1 specifically recites that the second wavelength band does not overlap with the first wavelength band, and that deviation of Raman amplification gain between the first and second wavelength bands is maintained within a predetermined deviation range.

* * *

Claim 26 is amended to recite the first pump light source being located in the repeater station, and the second pump light source being located in the transmitting station or the receiving station.

Grubb discloses a plurality of devices 12 positioned along a transmission line. See, for example, devices 12 in FIG. 2 of Grubb. Each device 12 supplies Raman pump light to the transmission line.

However, in Grubb, devices 12 are positioned along the transmission line between transmitters and receivers. See, for example, FIG. 2, of Grubb. Grubb does not disclose or suggest that a first pump light source is located in a repeater, and that a second pump light source is located in a transmitting station or receiving station, as recited, for example, in claim 26. Therefore, it is respectfully submitted that the overall structure of the system in Grubb is significantly different than that recited, for example, in claim 26.

* * *

In view of the above, it is respectfully submitted that the rejection is overcome.

III. REJECTION OF CLAIM 21 UNDER 35 USC 103 AS BEING UNPATENTABLE OVER GRUBB IN VIEW OF WU (US PATENT NO. 6,423,963)

Claim 21 is dependent from claim 20. Therefore, the comments in Section II, for distinguishing over Grubb, also apply here.

Wu discloses that pump light is shut off in response to a change in a supervisory signal transmitted from a supervisory source, to shut off the pump light in the event of a fiber cut. See, for example, FIG. 1, and the disclosure in column 4, line 28, through column 5, line 36, of Wu.

None of the references disclose or suggest stopping the supply of pump light when a warning is given in the specific situation as recited in claim 21.

In view of the above, it is respectfully submitted that the rejection is overcome.

IV. REJECTION OF CLAIMS 30-34 UNDER 35 USC 103 AS BEING UNPATENTABLE OVER GRUBB IN VIEW OF KOSAKA (US PATENT NO. 6,233,091)

Claim 30 recites the first pump light source being located in one of the transmitting station, the receiving station, and the repeater station, and the second pump light source being located in a different one of the transmitting station, the receiving station and the repeater

station. Claims 31-33 recite similar features.

Therefore, either the first pump light source or the second pump light source must be located in the transmitting station or the receiving station.

Grubb discloses a plurality of devices 12 positioned along a transmission line. See, for example, devices 12 in FIG. 2 of Grubb. Each device 12 supplies Raman pump light to the transmission line.

However, in Grubb, devices 12 are positioned along the transmission line between transmitters and receivers. See, for example, FIG. 2, of Grubb. Grubb does not disclose or suggest that pump light sources are located in a transmitting station or a receiving station. Therefore, it is respectfully submitted that the overall structure of the system in Grubb is significantly different than that recited, for example, in claim 30.

Moreover, claim 30 recites (a) a residual light detector, provided in a station opposing said one or said different one of said transmitting station, said receiving station and said repeater station, detecting optical power of residual pump light supplied by the pump light source in said one or said different one of said transmitting station, said receiving station and said repeater station, and (b) an adjustor, provided in said one or said different one of said transmitting station, said receiving station and said repeater station, adjusting optical power of said pump light provided by said one or said different one of said transmitting station, said receiving station and said repeater station so that a detection result from said residual light detector falls within a predetermined fixed range.

For example, a repeater station might include a pump light source supplying pump light. A residual light detector is then provided in a station (for example, a receiving station or a transmitting station) *opposing* the repeater station. The residual light detector detects optical power of *residual pump light* supplied by the pump light source in the repeater station. An adjustor, provided in the repeater station, would then adjust the optical power of the pump light provided by the pump light source so that a detection result from the residual light detector falls within a predetermined fixed range. Kosaka does not disclose or suggest such operation.

For example, in the rejection of claim 30, the Examiner refers to FIG. 30 of Kosaka. However, this figure only discloses an optical amplifier, and does not disclose any type of station opposing the optical amplifier. Moreover, no portion of Kosaka discloses or suggests that any type of control is performed based on *residual pump light* detected at a station *opposing the station from which the pump light was supplied*.

Although the above comments are directed to claim 30, it is respectfully submitted that the comments would be helpful in understanding differences of claims 31-34 over Kosaka.

In view of the above, it is respectfully submitted that the rejection is overcome.

V. CONCLUSION

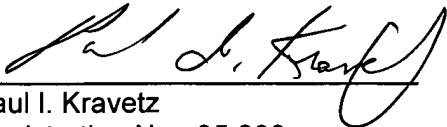
In view of the above, it is respectfully submitted that the application is in condition for allowance and a Notice of Allowance is earnestly solicited.

If any further fees are required in connection with the filing of this response, please charge such fees to our Deposit Account No. 19-3935.

Respectfully submitted,

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